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Getting to Know the Windows Phone 7 Device

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WHAT'S IN THIS CHAPTER?

- Getting to know the minimum specifications for Windows Phone 7 devices, including chassis design and screen resolution
- Understanding the phone hardware features
- Understanding the Start and Lock screens
- Understanding hubs and what goes in them

Microsoft has leveraged its considerable marketing muscle and published a very strict set of minimum guidelines on what hardware and features will be available on Windows Phone 7. These guidelines ensure that both users and developers will have a consistently high-quality experience, no matter who manufactures the device your games will be running on.

This chapter provides an overview of the minimum specifications every phone must have. It also discusses hardware features of the device and software features of the new Windows Phone 7 operating system, including the innovative hubs feature.

MINIMUM SPECIFICATIONS

When Windows Phone 7 was first announced, Microsoft created quite a stir with the initial feature set, as well as the promise that no hardware vendor would be allowed to sell a device branded as Windows Phone 7 unless it supported the following minimum specifications:

- *Two screen sizes* — 480 by 800 WVGA (available at launch, with 480 by 320 HVGA available at a later, unannounced date)
- *Capacitive touch* — Four or more contact points

- *Sensors* — Assisted Global Positioning System (aGPS), accelerometer, compass, ambient light sensor, proximity sensor
- *Camera* — 5 megapixel (MP) camera with a flash and dedicated camera button
- *GPU* — DirectX 9 acceleration
- *Hardware buttons* — Must be fixed on the face
- *Keyboard* — Optional
- *Multimedia* — Common detailed specifications, codec acceleration
- *Memory* — 256 MB, 8 GB Flash or more
- *Processor* — ARMv7 Cortex/Scorpion or better

In addition to establishing these minimum specifications, Microsoft has stated that certain features will not be allowed on devices branded as Windows Phone 7. Currently, that list of prohibited features includes removable memory (via microSD or any other format) and having any extraneous buttons on the face of the phone beyond the Back, Start, and Search buttons.

Chassis Design

One of the truly great things about Windows Phone 7 is the consistency of chassis design between manufacturers. This will likely change with future generations, but all the devices available at launch sport the same basic form factor. And, thanks to Microsoft's involvement, all devices also have a roughly identical feature set, as shown in Figure 1-1.

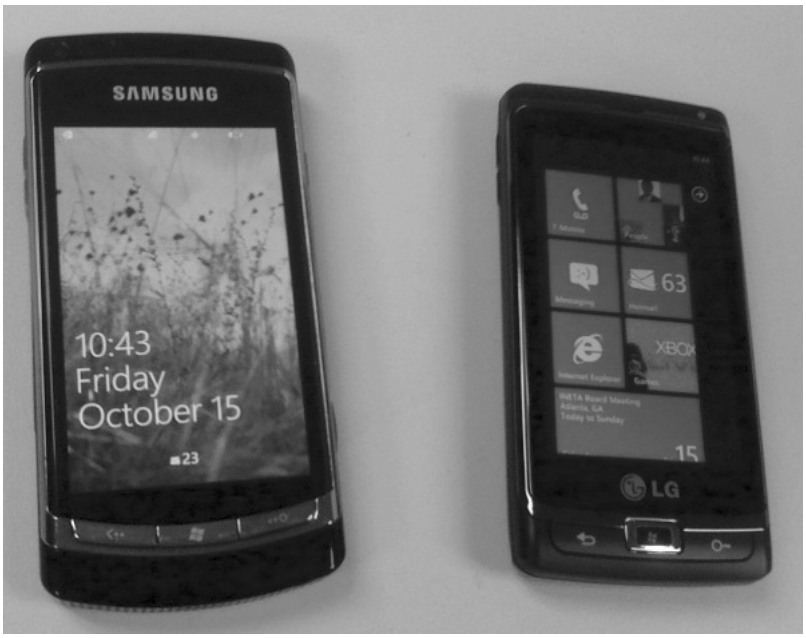

FIGURE 1-1: Two different Windows Phone 7 devices

Screen Resolution

All the Windows Phone 7 devices available at launch (sometimes called "Chassis 1" devices) are required to have a screen resolution of 480 by 800 pixels, also known as Wide Video Graphics Array (WVGA). Devices made available after launch (cleverly referred to as "Chassis 2" devices) may instead support a screen resolution of 480 by 320 pixels, also known as Half-size Video Graphics Array (HVGA).

PHONE FEATURES

In addition to a fixed resolution, all Windows Phone 7 devices are required to ship with support for multitouch, an accelerometer, GPS, a camera, and a number of other features. Let's take a closer look at some of these required features.

Capacitive Touch

All Windows Phone 7 devices are required to incorporate *capacitive-touch screens* that have support for at least four contact points. However, none of the default gestures shipping with XNA 4.0 (which are described in detail in Chapter 4) actually use more than two touches at once.

Capacitive sensors *detect anything that is conductive or that has dielectric properties (meaning it can store and discharge magnetic or electric energy). This is why you can wipe the phone's screen on your shirt without worrying about launching every app you own at once. In contrast,* resistive-touch screens *detect all pressure as input.*

Capacitive-touch screens have advantages and disadvantages compared to resistive-touch screens, as shown in Table 1-1.

TABLE 1-1: Advantages and Disadvantages of Capacitive-Touch Screens

ADVANTAGES	DISADVANTAGES
Capacitive-touch screens respond only to materials that are conductive (such as your finger), so you can clean them with a cloth without accidentally triggering input.	A regular stylus cannot be used with a capacitive-touch screen unless it is tipped with some form of conductive material.
Capacitive-touch screens are faster and more responsive than their resistive counterparts.	Capacitive-touch screens are more expensive to manufacture.
	Capacitive-touch screens are less accurate than resistive-touch screens.

While resistive-touch screens definitely have appealing user interface implications for game development, capacitive-touch screens are currently (and are likely to remain) the only option for Windows Phone 7.

Sensors

All Windows Phone 7 devices come standard with a number of sensors, including the accelerometer, aGPS, compass, light sensor, and proximity sensor.

Accelerometer

The *accelerometer* in Windows Phone 7 is used primarily for user interface control to present landscape or portrait views based on the device's physical orientation. It is commonly called a *tilt sensor*. The accelerometer also provides data that can be captured and used by your games and applications.

You'll learn how to access the accelerometer data in Chapter 3.

aGPS

Unlike a regular GPS, which can take up to a couple minutes to pinpoint your location, aGPS gets assistance from local cell towers to determine the satellites relevant to your location. The end result is a much faster start time and more accurate positioning.

With aGPS comes the proverbial good news and bad news:

- *The good news* — It's fast! Also, using aGPS typically requires less processing power, resulting in correspondingly longer battery life than with a regular GPS.
- *The bad news* — aGPS does not have a single unifying standard. Several different configurations are possible for aGPS, with actual implementation on the device largely left up to the device manufacturers and cellular providers.

Compass

All Windows Phone 7 phones are required to ship with a built-in *compass*. However, as of launch, there is no API support for the compass. The data may be accessed via device-specific APIs or open source libraries, both of which are beyond the scope of this book.

Microsoft would like anyone using other means to access compass data to convert it once API support for the compass is available so as to provide a consistent user experience for everyone.

Light Sensor

The *ambient light sensor* built into the phone is responsible for adjusting the brightness of the display based on the amount of available light. This sensor cannot be accessed or controlled via API and is not covered in this book.

Proximity Sensor

The *proximity sensor* is built into the phone hardware. It deactivates the screen when you place the phone near your face or any other body part or inanimate object. This prevents accidental dialing or feature activation during a phone call.

In the name of science, the authors of this book exhaustively tested hundreds (well, maybe not hundreds) of items to see what would trigger the proximity sensor. They are happy to report that putting the phone's screen next to nearly anything will suffice. The authors also determined during this testing that the phone's proximity sensor is active only during phone calls.

Sadly, this means that you won't be using it in your games, unless your game happens to be called "Make Several Phone Calls and See if the Screen Goes Dark When You Put the Phone Next to Your Face"! Of course, stranger things have happened. Neither of the authors (or anyone else) ever expected "I MAED A GAM3 W1TH Z0MB1ES!!!1" to sell more than 300,000 copies on Xbox Live Indie Games. So, who knows? Go for it!

Digital Camera

No self-respecting, super-cool smart phone would consider itself complete without a built-in camera and flash. Fortunately, Windows Phone 7 is no exception. All phones, regardless of manufacturer, are required to have a digital camera that supports a minimum of 5 megapixels. They are also required to have a dedicated camera button (for that "OMG!" candid shot) and a flash.

Megapixels *are calculated by multiplying the horizontal and vertical pixels of a camera's default image resolution — just like calculating the area of your backyard (assuming it's rectangular, like a picture from your new phone).*

Manufacturers aren't limited to 5 MP. Searching online reveals some upcoming phones that will start shipping with a 10 MP camera.

DirectX 9 Acceleration

If you've been paying attention to the media hype about Windows Phone 7, you've probably seen DirectX 9 acceleration mentioned a few times. It's an impressive bullet point, but what does it mean for your game?

When you're developing games (or any piece of software, for that matter), sometimes you push the edges of performance. Eventually, you will hit a limit on just how much more you can tweak your code to increase the performance. This is where hardware acceleration comes in and takes over.

Intensive tasks such as video playback and three-dimensional (3D) rendering can be moved from the CPU to the GPU, freeing the CPU for more of your game logic. Having a GPU that supports DirectX 9 acceleration means that you can write intense, high-performance games.

You might think that this acceleration is important only for 3D games. And you'd be right — sort of. Hardware acceleration is traditionally thought of as an important feature for developing 3D games, but it's important for two-dimensional (2D) games as well. This is especially true because there really isn't any such thing as a 2D game in XNA! You can make 2D games, but behind the scenes the XNA framework makes a 3D game with a fixed camera. Because of this, even your "basic" 2D games will benefit from DirectX 9 acceleration.

Face Buttons

Every device marketed as Windows Phone 7 is required to have the following three buttons on the face of the phone:

- Back button
- Start button
- Search button

Back Button

This works exactly as you would expect it to, just like the famous browser button of the same name. If you go to a new screen in your phone's user interface (UI) and click the Back button, you are magically transported — wait for it — back to the previous screen. Pure genius! Games and applications that you write can handle the Back button however you choose.

You will learn how to write code that responds to pressing the Back button in Chapter 6.

Start Button

Pressing the Start button returns you to the main Start screen no matter where you are or what application or game you are running. Applications exited in this manner go into a suspended state,

which can be detected and handled programmatically. This means that although you can't actually capture the Start button, you can still respond to the events it generates when it suspends your game.

You'll read more about the Start button in Chapter 6.

Search Button

Pressing the Search button launches the Bing Search screen on your phone, allowing you to get answers to all your burning questions (including where to get the best sushi within walking distance of your downtown Seattle hotel because your loser friends decided to go to a party and took the rental car without telling you).

QWERTY Keyboard

Slide-out keyboards are not part of the minimum required specification for Windows Phone 7 devices, but hardware manufacturers are free to incorporate them in their designs. The Dell Lightning has a portrait sliding keyboard that extends from the bottom of the phone, and the LG phone has a keyboard that slides out to the left (or the bottom if you are in landscape mode).

If your phone has a slide-out keyboard, you can use this in addition to the Soft Input Panel (SIP, an onscreen keyboard) when you need to type something. You can also use XNA to detect and respond to any keys pressed during a game.

You'll learn more about the SIP in Chapter 4.

Regardless of what model of phone or type of keyboard you have, it should work fine with XNA without any special configuration or code workarounds.

SOFTWARE FEATURES

In addition to an impressive array of hardware features and functionality, Windows Phone 7 devices sport some extremely cool software features. Let's look at a few.

Start and Lock Screens

The *Start screen* on Windows Phone 7 serves as your desktop and is the primary point of interaction with the device. This screen is designed to give you information at a glance about missed calls, text messages, unread e-mails, and more.

Hubs (discussed in the next section) are accessed via the Start screen. You can see previews of content along with notifications from their respective tiles.

You can also pin your games to their own tile on the Start screen. You will learn how to do this in Chapter 16.

The *Lock screen* secures your phone contents from prying eyes. It also keeps you from accidentally "butt dialing" your mom while at the office holiday party. Microsoft has also made the Lock screen useful by incorporating status updates similar to what you would find on the Start screen, just in a smaller fashion.

Hubs

Instead of simply offering screen after screen of unsorted icons for all your various applications and games, Windows Phone 7 organizes everything into *hubs*. These aren't just program groups or folders; they are actually highly interactive and quite revolutionary. You've never seen anything like hubs on a phone, so let's look at a few examples.

People Hub

The *People hub* pulls in contacts from a variety of social media sites (such as Twitter and Facebook), as well as any e-mail services you use (including Exchange and web-based mail such as Gmail and Windows Live). The People hub aggregates all your contacts, status updates, and images into a specially tailored set of views.

The main view dynamically sorts your contacts by their update timeline and allows you to quickly jump to their social network updates. In addition to letting you view the status updates of all your friends, this hub contains an area called "me," which allows you to view and update your own status.

Pictures Hub

The *Pictures hub* contains exactly what you would expect — pictures, and plenty of them. In addition to local storage, pictures are pulled from a variety of sources you define and control (including Facebook, Windows Live, and various online photo services, as well as the feeds of your contacts).

The Pictures hub also offers tight integration with the previously mentioned services, allowing you to upload and comment on photos directly from this hub.

Music + Video Hub

If you've seen one Zune HD, you've seen them all.

Seriously, this hub is virtually identical to the Zune HD, except that it's in your phone, which has the added bonus of making it way more useful than the Zune HD ever was. You also can use the super-cool Zune Pass to download unlimited music and video over WiFi and 3G. Video support includes the standard `.avi` and `.wmv` file formats, as well as DivX.

Games Hub

If you're not impressed by now, you will be shortly. The *Games hub* is made of 100 percent pure, undiluted "Awesomium." It integrates nicely with Xbox Live, featuring a 3D rendering of your Xbox Live avatar (not to be confused with the 7-meter-tall blue people who run around half-naked in the forest, or that little bald kid with the arrow tattooed on his head).

You also get Xbox Live games and achievements. Yes, you read that right. You're probably thinking, "Wow! Even the Xbox Live Indie Games developers don't get achievements." (Unfortunately, as of

this writing, access to these features is restricted to developers who have a publishing relationship with Microsoft.)

Furthermore, you get Spotlight feeds and the ability to browse gamer profiles directly from your phone.

Make no mistake — multiplayer and Xbox Live integration is a really big deal to Microsoft. There has been a big push in Redmond for turn-based casual games, so expect to see a lot of your favorite iPhone games popping up on Windows Phone 7 in the months around launch time. Some rather impressive 3D XNA games also are in the pipeline, including some with shared Xbox achievements, but obviously those can take a bit longer to create.

Marketplace Hub

Unlike with the previous Windows Mobile offerings from Microsoft, you really don't have any alternatives when it comes to getting content on your phone. Much like with Apple and its App Store, everything you put on your phone has to come from the Windows Phone Marketplace.

The *Marketplace hub* isn't just Microsoft's version of the App Store. Think of it as more of a one-stop shop for content of all types, whether it's applications, games, music, videos, or whatever else they can dream up in Redmond. Expect to also see branding here from whatever carrier your phone is using, because carriers will be able to add their own highlighted content as well.

Currently, the Marketplace hub is actually a bit more restrictive than Apple's App Store, since there is no option for distribution that bypasses the Marketplace (such as for beta testing, internal company use, and so on). Microsoft has acknowledged that this is not an ideal situation, and it plans to introduce new options, along with support for "enterprise customers." However, Microsoft has not said when that will be, other than sometime post-launch.

On a happier note, if you've been brutalized in the past by Apple's secretive application-approval process, you will be pleased to learn that Microsoft has implemented a "predictable and transparent" process for approving games and applications for the Marketplace. You can read all about it in the Windows Phone 7 Application Certification Requirements document, which is available at `http://create.msdn.com`.

Even better, Microsoft also says that it will not reject anything based on "duplication of functionality." (iPhone developers know all about this little gem.) Clearly, this opens a lot of possibilities for alternatives on Windows Phone 7, such as creating your own music player or Voice over IP (VoIP) application — as long as you can do it in Silverlight or XNA.

You will learn more about the Marketplace and how to get your own games on there in Chapter 16.

Office Hub

The authors would like to point out that if you skimmed past the sections on the Games hub and the Marketplace hub in your haste to get to this section, you are most likely reading the wrong book. We're just saying….

With the *Office hub*, you can view and comment on Word documents, Excel spreadsheets, and PowerPoint presentations, as well as use various aspects of OneNote and SharePoint to store and retrieve documents. In addition to documents, the Office hub lets you manage lists and tasks, as well as schedule appointments and meetings.

As long as you don't have any need for copy and paste, it's just like the real thing. Okay, not really, but it's as good as you're likely to get on a phone, and certainly better than on any other phone out there.

Other Applications

The following applications also ship with Windows Phone 7, but since they don't have any direct relationship to gaming or game development, there is little point in covering them in depth:

- E-mail
- Calendar
- SMS
- Internet Explorer
- Bing

In addition to this list, a number of third-party applications will ship with Windows Phone 7. Some of these will be on all devices, and others may be provider-specific or manufacturer-specific.

SUMMARY

The Windows Phone 7 device is a remarkably powerful and feature-laden phone that you can customize to fit your needs. Support is included for a broad set of hardware features, including aGPS, digital camera, light sensor, and more.

Hubs provide a means of collecting and interacting with content both locally and across the Internet. The Games hub brings the Xbox Live experience to your phone and everywhere you go. The Office hub provides document viewers, as well as support for OneNote and SharePoint. The Marketplace hub is how you get applications and games and music onto your phone.

In Chapter 2, you will learn how to download the tools and build your first XNA game using Visual Studio 2010 Express for Windows Phone.